



Fw:

Art Dohmann to: William Honker
Cc: Ray Leissner, Stacey Dwyer, Philip Dellinger

08/22/2012 02:10 PM

From: "Art Dohmann" <artdohmann@gmail.com>
To: William Honker/R6/USEPA/US@EPA
Cc: Ray Leissner/R6/USEPA/US@EPA, Stacey Dwyer/R6/USEPA/US@EPA, Philip Dellinger/R6/USEPA/US@EPA

Attached is information promised at the August 16, 2012 meeting by GCGCD.

In reference to the maps, the yellow indicator marks the vicinity of PAA-1. The orange indicators are the locations of the 7 dirty wells to the west and northwest of PAA-1 and the 8 Radium 226 wells to the east and southeast of PAA-1.

Please advise if you wish additional information or clarification of the information provided.

Art Dohmann
President, GCGCD

----- Original Message -----

From: **Barbara Smith**

To: 'Art Dohmann'

Sent: Wednesday, August 22, 2012 12:29 PM

 8-16-12 discussion follow-up08212012_00000.pdf

 Dirty Wells Information08222012_00000.pdf

 Duderstadt Comparison Chart08212012_00000.pdf

 GAM Run 09-010 Water Budget08212012_00000.pdf

 High Radium Wells Information08222012_00000.pdf  What is known...08212012_00000.pdf

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GOLIAD COUNTY GROUNDWATER CONSERVATION DISTRICT

118 S. Market St., P.O. Box 562, Goliad, Texas 77963-0562

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Board of Directors:

President – Art Dohmann

Vice-President – Joe Kozielski

Secretary/Treasurer – Barbara Smith

Directors – Wesley Ball, John Dreier, John B. Duke, Raulie Irwin

August 22, 2012

Mr. William K. Honker, P. E.
Acting Director
Water Quality Protection Division
U. S. Environmental Protection Agency, Region 6
1445 Ross Ave., Ste. 1200
Dallas, TX 75202-2733

Re: Topics of Discussion for Technical Goliad Aquifer Exemption August 16, 2012 meeting
with the EPA Follow-up

Dear Mr. Honker,

The Goliad County Groundwater Conservation District appreciates the opportunity to participate in this meeting. On behalf of GCGCD, President Art Dohmann commented on two items noted below. This letter is a further explanation of those comments along with supporting data.

1. Water wells in the vicinity of the proposed aquifer exemption that tested with levels of Radium 226 of 2 pCi/L and higher.
2. Information on potential vertical conduits existing during the exploration activity.

This is information addressing item 1.

The attached spreadsheet shows the location, date, and test information for the applicable wells. These wells are located east and southeast of the proposed aquifer exemption. These wells are located in the Goliad County Grid 14. GCGCD has test data for 91 wells in Grid 14. Also included is a map showing the location of these wells in reference to the PA-1 production area.

This is information addressing item 2.

In the area of the proposed aquifer exemption, there was extensive borehole drilling done in the early 1980's. Additional extensive borehole drilling was done beginning in July 2006 and continued through August 2008. In December 2006, GCGCD began doing water quality testing of selected wells in the area including one series of split testing of wells with UEC. During these initial tests, GCGCD recorded the first water levels of the two Duderstadt wells that are located up-dip of the proposed aquifer exemption. The shallow well produces from the A sand and the deep well produces from the B sand.

In March of 2007, the Duderstadts experienced dirty water in both of their wells. By July of 2007, five additional domestic water wells located to the northwest and west of the borehole drilling operation experienced dirty water. These seven wells experienced dirty water during the duration of the drilling operations and all seven wells cleared up within a few months of termination of drilling in August of 2008. Five of these wells also developed an iron bacteria formation.

These events were all documented and reported to the Texas Railroad Commission. All of the correspondence with the RRC was sent to Philip Dellinger on August 8, 2012. The RRC never conducted any site inspections citing lack of data, lack of resources, and lack of finances.

The Texas Railroad Commission plugging data for the 2006-2008 drilled boreholes was compiled by Bruce Darling. This document was transmitted to Jose Torres on August 7, 2012. This document shows that numerous boreholes were open for days and weeks before being plugged.

A chart is attached that shows the measured water levels of the two Duderstadt wells from December 2006 to current. Please note the erratic water levels during the time that borehole drilling was in progress. Then note the uniform water levels from November to current. The uniform water levels reflect gradual changes resulting from rainfall activity. When adjusting for difference in height of the measuring point, these two wells have the same water level.

The unanswered question of the erratic water levels and the dirty water wells is what caused this? There is no data to answer that question. Did the extended periods with open boreholes allow substantial rainwater entry? 2007 was a wet year with over 50 inches of rain recorded. Was there a vertical conduit for groundwater to migrate from a higher pressure zone to a lower pressure zone?

Was there a correlation between the open boreholes, the erratic water levels of the A and B Sands, and the dirty domestic water wells? Reliable water quality data and the development of accurate aquifer hydraulic data may be difficult to achieve when the aquifer is stressed and disturbed.

Sincerely,

Arthur A. Dohmann, President,
Goliad County Groundwater Conservation District

Attachments:

Spreadsheet of water wells with Radium 226

Map of water wells with Radium 226

Graphic of Duderstadt two domestic water wells levels

Aquifer Exemption Evaluation- What is known/What is not known

GAM Run09-010 Water Budget for GCGCD

Spreadsheet of "dirty wells"

Map of "dirty wells"



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Testing Results on "Dirty Wells"

ID#	Grid #	Well Location: GPS	Date Tested	Well Depth	Chloride	Sulfate	Nitrate	TDS	Arnesic	Iron	Selenium	Uranium	Gross Alpha	Radium 226	Radon 222	Iron Bacteria
1	6	14870 US Hwy 183N	12/21/2006		166	43	1.5	675	0.003	0.01	0.002	0.003		.3+/-1		
	6	14870 US Hwy 183N	10/10/2007													9000
2	13	28 52.172N 97 22.435W	1/3/2007		180	37	1.6	693	0.002	0.03	0.002	0.002		.4+/-1		
	13	28 52.172N 97 22.435W	4/26/2007		184	456	1	516	<.02	0.056	<.03					
3	13	28 52.172N 97 22.435W	10/10/2007													9000
	14	28 52.577N 97 21.741W	12/18/2006	300	129	42		562	0.001		0.005	0.0032	7+/-7	ND	378+/-149	
	14	28 52.577N 97 21.741W	12/18/2006	300	131	38	2	600	0.001	<.01	0.002	0.003	0	.7+/-1		
	14	28 52.577N 97 21.741W	4/26/2007	300	132	47	1.2	467	<.02	<.01	<.03					
	14	28 52.577N 97 21.741W	10/10/2007													<1
	14	28 52.577N 97 21.741W	1/20/2009		133	38.7	1.72	575	ND	ND	0.002	0.0033	1.3+/-2.3	.39+/-17	279+/-60.3	
	14	28 52.577N 97 21.741W	12/10/2009		127	37.7	1.59	566	ND	ND	0.002	0.0032	3.8+/-2.4	.16+/-14	160+/-73	
	14	28 52.577N 97 21.741W	10/26/2010		127	40.3	1.67	566	0.001	0.06	0.002	0.0034	1.7+/-2.5	.11+/-12	244+/-56.9	
	14	28 52.577N 97 21.741W	11/16/2011		132	38.2	1.73	554	ND	ND	0.003	0.0031	(-).6+/-3.6	.25+/-13	380+/-104	
4	14	28 51.954N 97 22.199W	12/19/2006		178	60	1.3	685	0.002	<.01	0.001	0.002		.6+/-1		
	14	28 51.954N 97 22.199W	4/26/2007		190	70	0.9	566	<.02	0.678	<.030					
	14	28 51.954N 97 22.199W	10/10/2007													9000
5	14	28 52.53N 97 21.118W	10/27/2006	80	202	68		830	0.002	0.04	0.006	0.0039	104+/-6	.2+/-3	241+/-62.2	
	14	28 52.53N 97 21.118W	12/15/2006	80	206	72	21	857	0.002	<.01	0.004	0.002		.3+/-1		
	14	28 52.53N 97 21.118W	10/10/2007	80												9000
6	14	28 52.528N 97 21.114W	12/15/2006	130	95	27	11	630	0.003	<.01	0.002	0.005		.3+/-1		
	14	28 52.528N 97 21.114W	4/26/2007	130	110	42		527	<.02	<.01	<.03					
	14	28 52.528N 97 21.114W	10/10/2007	130												9000
	14	28 52.528N 97 21.114W	1/28/2008	130	273	83.2		607	<.01	<.01	<.02					
	14	28 52.528N 97 21.114W	1/20/2009	130	88	36.5	6	627	0.003	ND	0.004	0.0046	4.5+/-2.9	.17+/-14	197+/-59.4	
	14	28 52.528N 97 21.114W	12/10/2009	130	76.3	36.5	3.98	643	0.003	ND	0.004	0.0054	5.2+/-2.8	.1+/-13	200+/-72	
	14	28 52.528N 97 21.114W	10/26/2010	130	65.8	23.2	4.95	615	0.004	ND	0.003	0.0062	5+/-2.9	.24+/-14	164+/-55.7	
	14	28 52.528N 97 21.114W	11/16/2011	130	76.7	29.8	5.85	613	0.003	ND	0.005	0.0062	3+/-4.4	.24+/-13	202+/-102	
7	14	28 51.908N 97 21.716W	12/18/2006	120	165	58		684	0.002		0.002	0.0038	8+/-7	.7+/-3	500+/-154	
	14	28 51.908N 97 21.716W	12/18/2006	120	173	55	0.6	646	0.002	<.01	0.001	0.003		1.1+/-1		
	14	28 51.908N 97 21.716W	4/26/2007	120	158	64	0.7	526	<.02	<.01	<.03					
	14	28 51.908N 97 21.716W	10/10/2007	120												<1
	14	28 51.908N 97 21.716W	3/31/2008	120	172	55.1	0.65	663	<.01	0.02	<.02	0.0034	14.7+/-2.5	.7+/-2	545+/-67.6	
	14	28 51.908N 97 21.716W	1/20/2009	120	175	55.7	0.451	674	0.002	ND	0.003	0.0032	3.8+/-2.7	.84+/-23	536+/-62.8	
	14	28 51.908N 97 21.716W	12/10/2009	120	133	54.5	0.476	655	0.002	ND	0.002	0.0034	7.1+/-2.9	1+/-18	610+/-89	

Testing Results on "Dirty Wells"

[illegible]



Google earth

miles
km



3



"Dirty Wells" 1-7



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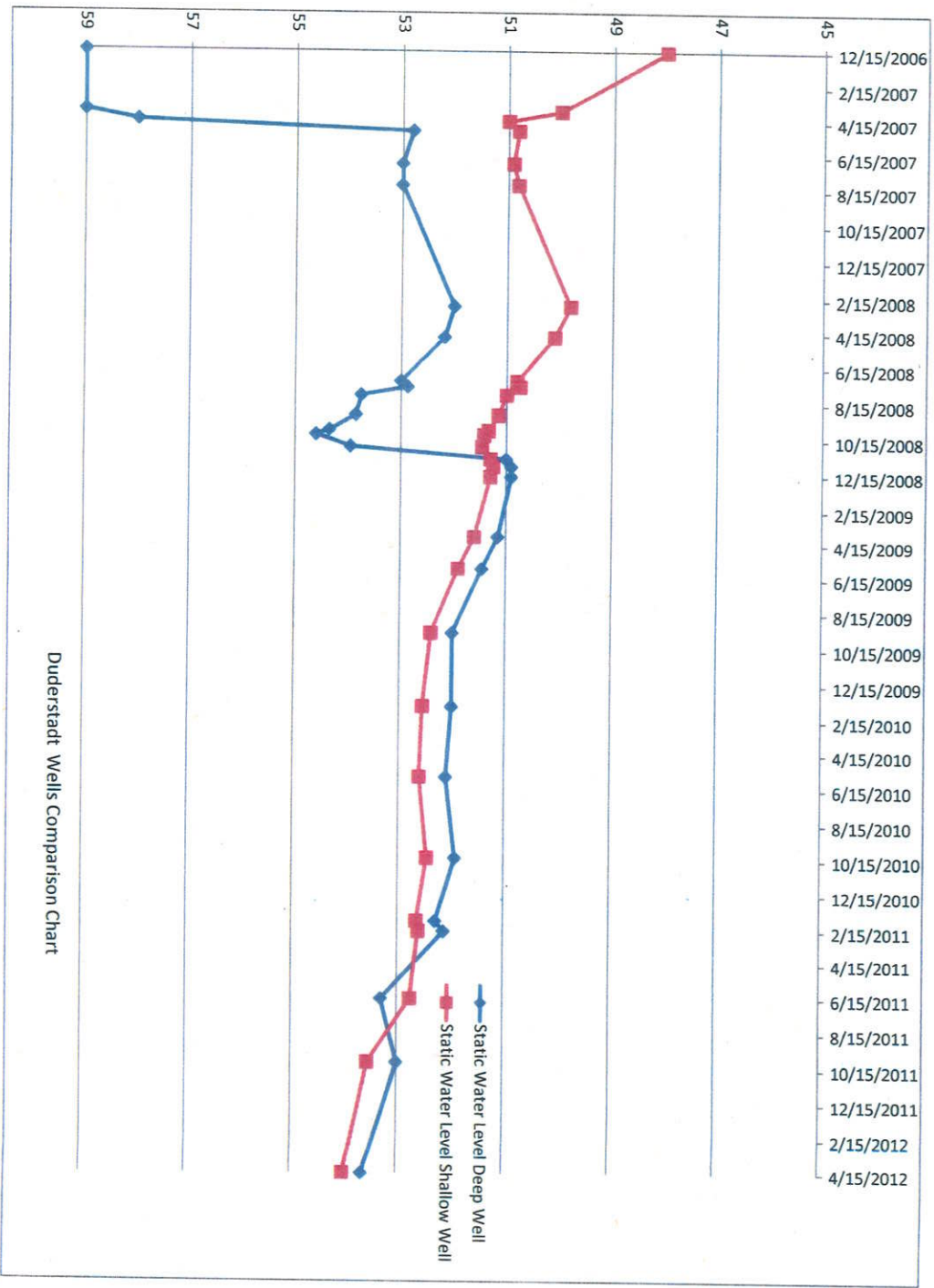
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Table A-9. Water budgets for Goliad County Groundwater Conservation District at the end of 2060 model simulation period using requested 11,472 acre-feet per year total "base" pumpage. Water budget values are reported in acre-feet per year. A dashed line indicates the aquifer does not exist or was not modeled for that county.

Goliad County Groundwater Conservation District	Chicot Aquifer	Evangeline Aquifer	Burkeville Confining Unit	Jasper Aquifer
Inflows				
Recharge	10,511	7,981	0	0
River losses	1,519	0	0	0
Stream losses	3,286	18,259	0	0
Water inflows from bays and/or gulf	--	--	--	--
Vertical leakage from upper unit	--	4,064	669	520
Vertical leakage from lower unit	85	522	426	--
Lateral inflows from adjacent county(s)	803	4,097	35	401
<i>Total Inflows</i>	<i>16,204</i>	<i>34,923</i>	<i>1,130</i>	<i>921</i>
Outflows				
Wells	700	10,375	300	100
Springs	6	1	0	0
Evapotranspiration	179	32	0	0
River gains	0	0	0	0
Stream gains	7,367	11,039	0	0
Water outflows to bays and/or gulf	--	--	--	--
Vertical leakage to upper unit	--	85	522	426
Vertical leakage to lower unit	4,064	669	520	--
Lateral outflows to adjacent county(s)	3,894	12,751	56	622
<i>Total Outflows</i>	<i>16,210</i>	<i>34,952</i>	<i>1,398</i>	<i>1,148</i>
Inflows - Outflows	-6	-29	-268	-227
Change In Storage	-6	-29	-269	-226
Model Error (acre-feet)	0	0	1	-1
Model Error (%)	0.00%	0.00%	0.07%	0.09%



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High Radium count wells

Tag #	Grid #	Well Location: GPS	Date Tested	Well Depth	Uranium	Radium 226
A	14	28 48.843N 97 19.967W	10/1/2007		0.0045	2.8+/- .6
B	14	28 51.483N 97 20.631W	12/18/2006	190	0.005	96.2+/-3.4
C	14	28 51.724N 97 20.950W	12/19/2006	164	0.002	29+/-1
	14	28 51.724N 97 20.950W	12/18/2006	164	ND	28.6+/-1.8
D	14	28 51.406N 97 19.976W	12/18/2006	80	0.0064	12+/-1.2
	14	28 51.406N 97 19.976W	12/22/2006	80	0.004	12+/-1
	14	28 51.406N 97 19.976W	3/31/2008	80	0.006	11.1+/- .7
	14	28 51.406N 97 19.976W	1/20/2009	80	0.0059	13+/- .76
	14	28 51.406N 97 19.976W	12/10/2009	80	0.006	13+/- .74
	14	28 51.406N 97 19.976W	10/26/2010	80	0.0062	14+/- .75
	14	28 51.406N 97 19.976W	11/15/2011	80	0.006	17+/- .81
E	14	28 47.938N 97 18.892W	10/1/2007		0.0034	4.6+/- .7
F	14	28 52.337N 97 20.406W	12/18/2006	257	0.004	2.6+/-1.8
G	14	28 50.550N 97 17.688W	7/30/2007	100	0.003	3+/- .6
	14	28 50.550N 97 17.688W	1/20/2009	100	0.0025	3.5+/- .41
	14	28 50.550N 97 17.688W	12/10/2009	100	0.0024	3+/- .3
	14	28 50.550N 97 17.688W	10/26/2010	100	0.0024	2.9+/- .36
	14	28 50.550N 97 17.688W	11/15/2011	100	0.0023	3.5+/- .37
H	14	28 50.629N 97 19.536W	11/26/2007		0.003	12+/-80.3
*		PA1				



Google earth

miles 7
km 10



High Radium 226 Wells A-H



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UR-03075 AQUIFER EXEMPTION EVALUATION

WHAT IS KNOWN

- The AE is located in the recharge area of the Evangeline Aquifer in north Goliad County. The Evangeline Aquifer is part of the Gulf Coast Aquifer. The Texas Water Development Board Central Gulf Coast Model quantifies this recharge as 7,981 acre feet per year.
- The AE consists of 423.8 acres and the depth includes all four sands of the Evangeline Aquifer that exist in that area.
- There are many domestic and livestock water supply wells in the corridor around the AE. Most of the wells are completed in the top two sands and some are completed in the lower two sands. There are two livestock water supply wells within the AE.
- There are two faults in the vicinity of the AE. A portion of the north-west fault is within the boundary of the AE. The south-east fault is outside and down-dip of the AE boundary.
- According to cross sections included in the permit application, there is considerable variability in elevations and thickness of the aquifer sands. At the faults, there are likely hydraulic connections from one sand zone to another caused by the vertical offset of geologic units at the fault.
- There are elevated levels of radium in RBLB 1,3,4,5 wells, PTW 1-14 wells, and the PA1 monitor wells on the east quadrant. These wells are inside of the AE boundary. Outside of the AE boundary to the south-east, levels of radium in some domestic and livestock wells that have been tested are higher than noted in other area wells that have been tested.
- As documented in the USGS study of the Coleta Creek Watershed, at least the A and B aquifer sands supply baseflow to the creek.

WHAT IS NOT KNOWN

- The quality of the groundwater in the AE area prior to exploration borehole drilling is not available.
- There are no direct measurements of fault hydraulic properties, although the horizontal permeability of the northwest fault appears to be less than that of the adjacent sand units.
- Groundwater flow direction and hydraulic head of the sand units of the southeastern fault are unknown.
- There is limited scientific data dealing with groundwater migration directions and rates.
- The source of elevated Radium levels in drinking water wells located down dip of the AE and south of the southeast fault is unknown and needs to have a comprehensive scientific evaluation.